Construction and Validation of a Clinical Model Predicting pCR after Neoadjuvant Immunotherapy in Breast Cancer

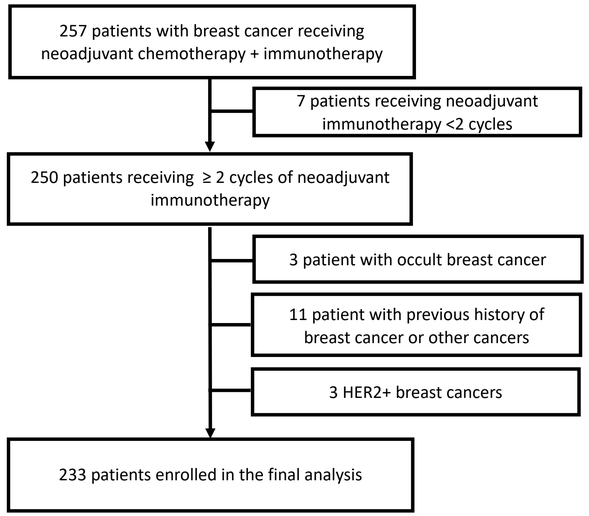
Min Lin, MD; Tian Du, MD; Yan Wang, MD; Gehao Liang, MD; Hao Wu, MD; Ning Li, MD; Jun Tang, MD
Sun Yat-sen University Cancer Center

Background

- Neoadjuvant immunotherapy combined with chemotherapy has shown promising potential in breast cancer management.
- Predicting pathological complete response (pCR) in those patients remains challenging.
- This study aims to develop a predictive model for pCR in breast cancer patients receiving neoadjuvant chemoimmunotherapy (NACI).

Methods

This retrospective study included patients diagnosed at our institution with early invasive breast cancer who underwent surgery post NACI and had available data for pCR/RD.



Results

Demographic & Clinical Characteristics

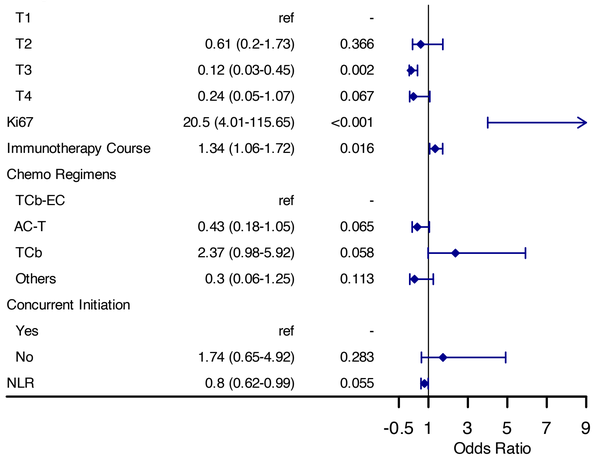
- 52.8% of the patients achieved pCR (ypT0N0/ypTisN0).

Characteristics	Non-pCR (n=110)	pCR (n=123)	*p*-value
Age (years), median (IQR)	47.1 (38.5-54.6)	46.1 (38.4-52.5)	0.551
Pretreatment clinical T stage, n (%)			**<0.001**
T1	8 (7.3)	15 (12.2)	
T2	63 (57.3)	94 (76.4)	
T3	26 (23.6)	8 (6.5)	
T4	13 (11.8)	6 (4.9)	
Pretreatment clinical lymph node status, n (%)			0.678
N0	11 (10.0)	17 (13.8)	
N1	39 (35.5)	47 (38.2)	
N2	25 (22.7)	27 (22.0)	
N3	35 (31.8)	32 (26.0)	
Pretreatment Ki67 (%), median (IQR)	70.0 (40.0-80.0)	80.0 (60.0-80.0)	**0.001**
Pretreatment subtypes, n (%)			0.177
HR+/HER2-	11 (10.0)	5 (4.1)	
HR-low/HER2-	23 (20.9)	31 (25.2)	
TNBC	76 (69.1)	87 (70.7)	
Chemotherapy regimens, n (%)			**<0.001**
TCb-AC	48 (43.6)	64 (52.0)	
AC-T	29 (26.4)	15 (12.2)	
TCb	20 (18.2)	41 (33.3)	
Others	13 (11.8)	3 (2.4)	
Immunotherapy agents, n (%)			0.445
Pembrolizumab	23 (20.9)	35 (28.5)	
Toripalimab	40 (36.4)	40 (32.5)	
Tislelizumab	32 (29.1)	30 (24.4)	
Camrelizumab	10 (9.1)	8 (6.5)	
Sintilimab	5 (4.5)	10 (8.1)	
Immunotherapy cycles, n (%)	6 (4-8)	7 (6-8)	**<0.001**
Concurrent initiation of immunotherapy and chemotherapy			**<0.001**
Yes	42 (38.2)	21 (17.1)	
No	68 (61.8)	102 (82.9)	
Pretreatment NLR, median (IQR)	2.82 (2.02-3.48)	2.10 (1.53-3.11)	**<0.001**

Multivariate Analysis

- Factors with *p*-values<0.05 were included for multivariate analysis.

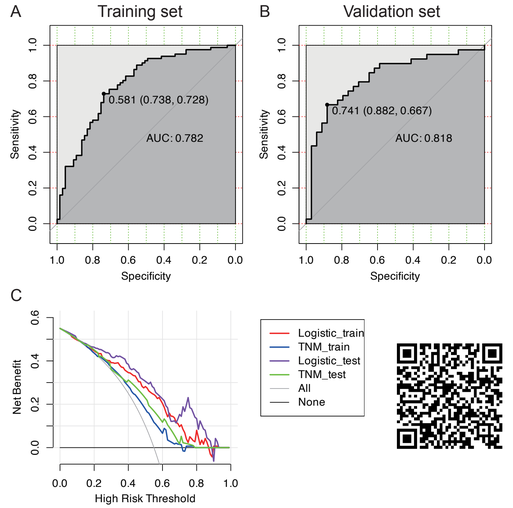
Characteristics	OR (95%CI)	P.value
T Stage		
T1	ref	-
T2	0.61 (0.2-1.73)	0.366
T3	0.12 (0.03-0.45)	0.002
T4	0.24 (0.05-1.07)	0.067
Ki67	20.5 (4.01-115.65)	<0.001
Immunotherapy Course	1.34 (1.06-1.72)	0.016
Chemo Regimens		
TCb-EC	ref	-
AC-T	0.43 (0.18-1.05)	0.065
TCb	2.37 (0.98-5.92)	0.058
Others	0.3 (0.06-1.25)	0.113
Concurrent Initiation		
Yes	ref	-
No	1.74 (0.65-4.92)	0.283
NLR	0.8 (0.62-0.99)	0.055



Forest plot of multivariate logistic regression analysis. TCb-AC: paclitaxel and carboplatin followed by doxorubicin and cyclophosphamide; AC-T: doxorubicin and cyclophosphamide followed by paclitaxel; TCb: paclitaxel and carboplatin; NLR: neutrophil-to-lymphocyte ratio.

Model Performance

- Patients were randomly split using a 2:1 ratio into training and validation datasets.
- The final logistic regression model integrates pretreatment clinical T stage, Ki67 expression, NLR, chemotherapy regimens, and number of immunotherapy cycles.



Conclusion

- Pretreatment clinical T stage, Ki67 expression, NLR, chemotherapy regimens, and number of immunotherapy cycles were associated with pCR after neoadjuvant immunochemotherapy.
- We developed a simple and clinically interpretable model for predicting pCR in breast cancer patients undergoing neoadjuvant chemoimmunotherapy.

Contact
Min Lin
Sun Yat-sen University Cancer Center
Email: linmin@sysucc.org.cn

References
1. Schmid, P. et al. Pembrolizumab for Early Triple-Negative Breast Cancer. N Engl J Med. 382, 810-821.
2. Sharma, P. et al. Clinical and Biomarker Findings of Neoadjuvant Pembrolizumab and Carboplatin Plus Docetaxel in Triple-Negative Breast Cancer: NeoPACT Phase 2 Clinical Trial. JAMA Oncol. 10, 227-235.
3. Hou, Y. et al. Serum cytokines and neutrophil-to-lymphocyte ratio as predictive biomarkers of benefit from PD-1 inhibitors in gastric cancer. Front Immunol. 14, 1274431.

This presentation is the intellectual property of the author/presenter. Contact them at linmin@sysucc.org.cn for permission to reprint and/or distribute.
© POSTER TEMPLATE BY GENGRAPHICS · 1.800.790.4001 · WWW.GENGRAPHICS.COM